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ENGINEERING REPORT

FAA CONTRACT NO. DTFA03-02-C-00044 PHASE 1, CLIN 0001e (TASK 5) - REMOVAL OF SPECIMENS REPORT

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EXECUTIVE SUMMARY

This report documents the physical disassembly of retired aircraft N474DA to remove specimens for destructive evaluation. The objective of the disassembly was to remove the target structures required for evaluation without subjecting them to puncture, overload, or any other damage that would render them unusable for the intended research.

This report provides a chronological journal of the disassembly, including photographs taken onsite. This report also catalogues the critical engineering and planning issues addressed during the process. In general, these issues are applicable to any destructive evaluation project of this scope.

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LIST OF ACRONYMS

AD	Airworthiness Directive
BL	Butt Line (Aircraft Coordinate System)
BS	Body Station (Fuselage Aircraft Coordinate System)
FASTER	FAA's Full-Scale Aircraft Structural Test Evaluation and Research facility
FS	Fuselage Station (Aircraft Coordinate System)
FWD	Forward
MED	Multiple Element Damage
MSD	Multiple Site Damage
SB	Service Bulletin
SSI	Structurally Significant Item
SSID	Supplementary Structural Inspection Document
WFD	Widespread Fatigue Damage
WL	Water Line (Aircraft Coordinate System)
WS	Wing Station (Aircraft Coordinate System)

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CHAPTER 1. INTRODUCTION

This report supports Task 5 of FAA Contract DTFA03-02-C-00044, the Removal of Specimens. The purpose of this report is to document the removal of the selected sections from N474DA.

All work required by within Task 5 of the Statement of Work has been completed. This report, along with receipt of the undamaged test specimens to the Delta Technical Operations Center, satisfies the deliverable requirement for CLIN 0001e. All test specimens were received and stored at the Delta TOC by 12/11/02.

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CHAPTER 2. CONTRACT STATEMENT OF WORK

The contractor shall remove the selected sections from the aircraft without damaging those structural details identified for analysis. Care must be taken by the contractor to provide adequate support for the structure during removal to prevent overloading and damage of the sections. The skins and substructure of the four fuselage panels designated for testing in the FASTER facility must not be breached or otherwise made unacceptable for testing in the FASTER facility. The contractor shall be responsible for the safe shipment of sections to the testing and analysis sites. The contractor shall be responsible for damage associated with removal and shipping of the specimens.

Contract Deliverable: Receipt of Structure to testing and analysis sites

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CHAPTER 3. CRITICAL LESSONS

The removal of specimens from N474DA reinforced a set of critical lessons that are valid for any large-scale project of this type. Those critical lessons include:

- The Importance of Shoring. The specimens removed for WFD research are large primary structures by definition. Therefore, it was critical that the remaining aircraft be shored completely to ensure safety and structural integrity after each test specimen was removed. For example, the fuselage crown is typically in tension when a aircraft is on its landing gear or similar supports. This tension load must be re-distributed by shoring before large crown panels can be removed.

For this project, shoring built from railroad ties was placed along the length of the fuselage from the nose landing gear support to the tailstrike damper. During the disassembly process, shoring on the wing was replaced with a new stack at the wing root, and then removed completely.

- The Disassembly Sequence. The sequence is driven primarily by shoring concerns. This simplest approach is a “tree-topping” method, where all cuts progress from outboard towards the center. With this approach, the wing tips, vertical stabilizer, and nose are removed first, The wing and fuselage sections are removed in manageable pieces, and the centerwing structures are removed last.

An alternative sequence removes the target areas immediately, using shoring only to unload the specimens. This method requires fewer total cuts, but is more difficult to accomplish. The shoring must remain in place, so it interferes with work being done. Also, since some integrity must be maintained, there are limits to which structures can be cut.

For this project, a hybrid approach was used. Outer wing and vertical stabilizer structures were removed with the “tree-topping” method. Fuselage panels and the centerwing front spar were removed using the alternative sequence. The keelbeam and centerwing lower surface were left intact to ensure fuselage integrity.

- Hoisting. The method of hoisting is critical to ensure that the specimens are not overloaded, dropped, or otherwise damaged during removal. For this project, the majority of specimens were

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hoisted with a crane and lifting straps. Prediction of the approximate specimen weight was important in choosing the correct capacity crane and lifting straps. Straps were wrapped through the specimens based on the location of the specimen center of gravity, and to prevent the specimens from dropping under gusty wind conditions.

- The Choice of Cutting Tools. All cuts were made with cut-off saws, but no one saw is acceptable for all cuts. For this project, the majority of the work was done either with 12” cut-off saws or 3” ziz-wheels. The 12” saws cut quickly through thick structure and wide skins, but the 3” wheel was needed for access in tight areas. There are many tight areas within this project, including the vertical fin front and rear spars, the empennage torque boxes, fuselage floor beams, and fuselage frame intercostals and system structural provisions. Large 14” diameter saws were used to cut thick areas in the wing.
- Interior and Systems Items. Much of the time required for the disassembly was spent on systems-related issues, as opposed to the cutting of structure. Interior items such as galleys, lavatories, overhead bin structure, and insulation must all be removed prior to fuselage cutting. Most large structures have a collection of control lines, fuel lines, hydraulic lines, and wires that must be cut before the structure can be removed. It is important that the fuel and hydraulic lines be purged of fluid before these cuts are made.
- Allowances for Remote Locations. Retired aircraft are typically stored in remote areas of an airport, far from the hanger where maintenance is routinely done. For this project, the aircraft was stored in desert sand on the opposite side of the runway from the hanger facilities. Tripod jacks and hydraulic lifts designed for a paved hanger environment could not be used. All shoring was done with railroad ties. All lift vehicles needed off-road tires. Portable compressed air and A/C generators were required.

The weather was also an important factor. Fuselage panels could not be lifted in gusty winds. Removed specimens and the aircraft had to be secured to prevent wind damage. Work to the outside of the aircraft was slow during periods of high wind, cold rain, and blowing sand.

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- Shipping. Packaging of the removed specimens for shipping was critical. For this project, the crown panel boxes were designed to hold one panel each, with contour ribs at every other frame station. This method protected the panels during shipping, but creates an oversized shipping container that requires special treatment for loading and transport. Engineering drawings of any shipping crate design are important, particularly when working with local contractors.

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CHAPTER 4. JOURNAL

Removal of the test specimens from N474DA was accomplished at the Southern California Logistics Airport in Victorville, CA from Nov 6th through Dec. 5th, 2002. This chapter itemizes the removal of specimens as a chronological process, including critical engineering decisions as well as the physical disassembly of aircraft structure. It does not itemize the visual and NDI inspections that occurred concurrently, as those events are discussed in detail in the Field Inspection Report.

Nov 6th - Nov 9th

- Removed remaining interior items for access to accomplish internal visual and MFEC inspections
 - Insulation from S-10L to S-10R lap joints and frame clips
 - C1 floor for access to S-26L
 - Lavatories and insulation for access to FS 1183 bulkhead
- Painted cut-lines to divide each wing outboard of the target specimens into three manageable sections.
- Removed vertical stabilizer forward fairing (“Doghouse”)
- Removed scrap wing sections outboard of the wing target specimens (W6 and W7). Aircraft is resting on railroad tie shoring installed below W6 and W7, so no further wing cuts are possible until that shoring is removed and replaced.
- Removed outboard sections of horizontal stabilizers at actuator access panels. Elevators had been removed at aircraft retirement.

Related Figures:

Figure 1: Right Wing Cut-lines and W7

Figure 2: Left Wing Cut-lines

Figure 3: Under-cutting the left wing

Nov 10th

- Using a heavy-lift forklift (20,000 lb. capacity), lifted each side of the aircraft using the existing shoring. Added 4 new shoring stacks:
 - under each wing, inboard of the target specimen

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- at the keel beam, under the centerwing
- under the aft fuselage
- Removed W6
 - Cut along the lower surface first, followed by spar webs.
 - Access holes cut into leading edge to cut anti-icing ducts and control cables
 - Support W6 with forklift
 - Cut upper surface
- Cut F, removing wing outboard of W7
- Related Figures:
 - Figure 4: Preparing to lift left wing shoring under W6
 - Figure 5: Supporting outer wing while stacking new shoring inboard of W6
 - Figure 6: Stacking new right wing shoring inboard of W7

Nov 11th

- Removed W7
 - Cut along the lower surface first, followed by the spar webs.
 - Cut access holes into leading edge to cut anti-icing ducts and control cables
 - Support W7 with forklift
 - Cut upper surface
- Began removing horizontal stabilizer (H1 and H2). The stabilizer will be removed as much as practical per the Maintenance Manual.
 - Since the jackscrew manual trim controls are no longer active, stabilizer cannot be pitched, so procedures cannot be followed directly.
 - Fairings and actuators are cut instead of unfastened.
- Met with carpenters to specify design for the four large crown panel shipping boxes.

Related Figures:

Figure 7: W7 removed

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Nov 12th

- Finished removing interior insulation above S-17
- Removed H1 and H2
 - Stabilizer pivot lugs and jackscrew fittings were cut, rather than removing pins. These cuts are far away from the MSD/MED susceptible structure to be studied in this program.
 - Stabilizer section had to be pivoted out of the vertical stabilizer, so it was lifted then lowered with a high-lift forklift.

Related Figures:

Figure 8: Removing the horizontal stabilizer trim actuator

Figure 9: Painting the fuselage crown cut lines

Figure 10: Supporting the H1 and H2 prior to removal

Figure 11: H1 and H2 lifted from vertical stabilizer

Figure 12: H1 and H2 lowered to ground

Nov 13th

- Vertical stabilizer removed in three sections:
 - At lower edge of upper rudder
 - At lower edge of lower rudder
 - At upper cut-line for the vertical fin rib specimens (FN1 and FN2)
- Finished painting the fuselage cut-lines. Since the fuselage frames are floating in the crown, there are no rivets to identify frame locations from the outside. The cut-lines were measured from nearest butt splice.
- Added additional shoring under the forward and aft fuselage. Shoring now exists under the entire fuselage to support the fuselage as the crown panels are removed.

Related Figures:

Figure 13: First of three vertical stabilizer sections removed

Figure 14: Painted cut-lines finished

Figure 15: Last vertical fin section above FN1/FN2 removed

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Nov 14th

- Finalized tactics for removing the crown panels:
 - Panels are cut through the skin on the outside first. This typically leaves the frame inner chords intact
 - Duct tape is wrapped over the sharp edges of the skin, to prevent damage to the lift straps.
 - The cut-lines separating the panels are at frame locations. So, if one panel edge has a frame, the adjacent panel has 20 inches of unsupported skin. In most cases, the lift strap was run through the stringer section to avoid loading the unsupported skin.
 - Lift straps were woven through the frames. At most locations, the strap was under the frame, so that the frame would support the panel weight during lifting. At the edge, the straps were woven between the frame and skin, for lateral security.
 - Slack from the lift straps was removed by hand-tightening. Still, over-tightening by hand led to a small skin crack in the right forward edge of F3/FT1. This crack is well contained within the rough area that will be removed from the FASTER test panel, so it does not affect the test specimen.
 - After the frame inner chords were cut, each panel was lifted by hand to ensure it was completely free before the panel was lifted by the crane.
- Constructed a staging area to place each panel after removal
 - A stack for each panel was built from railroad ties, to support the panel only at S-3L and S-3R. This support ensures that loads tending to distort the fuselage curvature are not applied.
 - Sandbags on top of the ties distribute the support loads
 - Each panel was secured to its ties with rope, to prevent the wind from blowing them away.
- Removed all four large panels, from front to rear

Related Figures:

Figure 16: Start crown panel cuts

Figure 17: Lifting straps between S-3 and S-4

Figure 18: F3/FT1 removed

Figure 19: F3/FT1 guided to staging area

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Figure 20: F3/FT1 lower onto staging ties

Figure 21: F4/FT2 removed

Figure 22: Lift point uses stringer centerline

Figure 23: Staging area for 4 large crown panels

Figure 24: Panels secured to staging ties

Figure 25: Cutting through steel frame straps for F5/FT3

Figure 26: F5/FT3 removed

Figure 27: F6/FT4 Ready for lifting

Figure 28: F6/FT4 removed

Figure 29: F6/FT4 carried to staging area

Figure 30: End of 11/14/02

Nov 15th

- Removed F1 and F2 crown panels
 - Cutting and lifting methods were the same as for the large crown panels.
 - The two panels were staged onto railroad tie stacks at S-5L and S-5R. Sandbags at the fore and aft frames secured the panels.
 - Note that F2 was cut into two halves on Nov 26th to reduce shipping risk, becoming F2A and F2B.
- Began loading W6 and W7 into their respective shipping boxes.

Related Figures:

Figure 31: F2 removed

Figure 32: W6 and W7 put into boxes

Figure 33: F1 removed

Nov 20th

- Removed remaining crown section over the wings. This is a thick-skinned area that is not critical for lap joint MSD, so it was scrapped.

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- Finished putting W6 and W7 into their shipping boxes. Internal 2x4's prevent shifting during shipping.
- Contour support ribs for the large crown panel shipping boxes arrive.
- Cut and removed the three window-belt panels F7, F8, and F10.
 - F7 and F8 were lifted with a single strap looped through the emergency exit door cutouts.
 - F10 was lifted with a single strap looped through two window cutouts, approximately 1/3 and 2/3 of the panel length.
 - The forward edge of F10 was inadvertently struck on the lift boom of the crane/forklift. However, the only damage evident is to the frame at the forward cut-line, which was already damaged by the cutting saw.
- Received the support ribs that will be installed under the large crown panels to maintain their contour during shipping.
- Cut and removed the three fuselage panels at tearstrap ultrasonic indications (F11, F12, and F13). These panels are light, so they were lifted from the aircraft by hand.
- Cut and lowered the S-26L panel (F9)
 - After discussion with the FAA, it was decided that this area was unsuitable to be a FASTER test panel. The fuselage radius is not constant in the hoop direction, and the frames near the bottom centerline are too deep. In addition, there are dents in the lap joint from the original lowering of the aircraft onto shoring in 1998.
 - Cut-lines originally drawn were cancelled, and new lines were drawn at S-25L and S-27L.
 - This section is relatively light, so it was lowered by hand onto a waiting forklift.

Related Figures:

Figure 34: Overhanging crown section removed

Figure 35: Support ribs for crown panel boxes

Figure 36: F8 ready to be cut

Figure 37: F7 removed

Figure 38: F7 lowered to staging ties

Figure 39: Cutting F8

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Figure 40: Removing F8

Figure 41: Staging F8

Figure 42: Cutting F10

Figure 43: Lifting F10

Figure 44: Cutting F11 and F12

Figure 45: Removing F11

Figure 46: Cutting F9

Figure 47: Lowering F9

Nov 21st

- Cut and removed the vertical stabilizer rib and stringer attachments (FN1 and FN2) in one piece.
 - Note that stringer repairs already exist at S-4R, S-5R, S-6R, and S-8R. The skin splice stringer is S-7R.
 - A fork puncture through the rear spar web occurred when titanium angels nested in the rear spar chords were inadvertently left un-cut when the rib was removed. The skin and stringers were already cut, so there was no damage or overload to FN1 or FN2.
- Cut fuselage Section 48 away from the rest of the fuselage at the forward FT6 cut-line
 - Section 48 was removed to reduce weight and applied moment on the fuselage to improve stability.
 - Stability of the remaining fuselage improved as it settled onto its shoring.
- Prepared shipping boxes for large crown panels
 - Ribs were covered with bubble-wrap
 - Banding strap pass-through holes were cut into the ribs at centerline, below S-6L, and below S-6R
- Lowered F3/FT1 into its box and prepared for shipment

Related Figures:

Figure 48: Cutting FN1 and FN2

Figure 49: Removing FN1 and FN2

Figure 50: Lowering FN1/FN2 to the staging pallet

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Figure 51: Installing ribs into one of the four large panel boxes

Figure 52: Undercut to remove Section 48

Figure 53: Section 48 separated

Figure 54: Section 48 stabilized

Figure 55: Shipping boxes ready for large crown panels

Figure 56: F3/FT1 lowered into its box

Figure 57: F3/FT1 banded and bubble-wrapped

Nov 22nd

- Prepared the remaining large crown panels for shipment
 - Removed intercostals and tension rods that provided structural provisions for life rafts and overhead bins.
 - Removed all antennas and position lights
 - Cut away L2 and R2 door cutout upper sills (S-9 left and right) on F6/FT4. These sills would have interfered with its contour ribs.
 - Notched 4” from the two inside contour ribs for F6/FT4 to allow L2 and R2 auxiliary sills to remain in place. These aux sills could not be removed in the field without placing undue risk on the test panels.
- Removed left and right stub wings
 - Supported left wing stub with forklift, and cut the lower wing surface.
 - Lifted aircraft slightly at the left stub wing. Removed all left wing shoring, then lowered left stub wing. Load is transferred to the shoring at the keelbeam under the centerwing, and to the other fuselage shoring.
 - Supported right wing stub with forklift, and cut the lower wing surface.
 - Lifted aircraft slightly at the right stub wing. Removed all right wing shoring, then lowered right stub wing. More load is transferred to the shoring at the keelbeam under the centerwing, and to the other fuselage shoring.
 - Removed the left and right trailing edge fairings and MLG beams
 - Removed the left and right leading edge wing-to-body fairings.

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- Removed the left and right wing stubs with forklift

Related Figures:

Figure 58: Next panel lowered into box

Figure 59: Left and right wing fairings and MLG beams removed

Figure 60: Wing root shoring removed

Figure 61: Left wing stub removed

Figure 62: End of 11/22/02

Nov 25th through Nov 27th

- Began cuts to separate aft pressure bulkhead (FT6) from Section 48
 - Loosened S-duct for access. S-duct cannot be removed intact.
 - Cut through No. 1 and No. 3 engine pylons
 - Cut through No. 2 engine pylon and vertical stabilizer front spar structure
 - Cut through Section 48 skin except for area under ventral stairway (tail-strike damper backup structure)
- Aircraft was stabilized against rolling in high winds
- Removed cabin floor panels above centerwing.
- Prepared right side-of-body rib (W2 and W4) for removal
 - Removed ducting for climate control systems
 - Removed center wing tank access plates
 - Marked cut lines for front spar and rib access hole

Related Figures:

Figure 63: Cutting FT6 from Section 48

Figure 64: A/C stabilized against high winds

Figure 65: Stackable shipping pallets for F7, F8, and F10

Dec 2nd and Dec 3rd

- Separated aft pressure bulkhead (FT6) from Section 48
 - Lifted FT6 with single strap through ventral door

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- Lowered bulkhead to pallet, forward side down. Banded bulkhead to pallet for shipping
- Removed W2 and W4 in one piece with right side-of-body rib
 - Bottle pins from wing spars to fuselage bulkheads are left intact
 - Front and rear spar web cuts were made from inside the centerwing tank.

Related Figures:

Figure 66: Right Side-of-body wing rib (W2/W4) in box

Figure 67: Aft pressure bulkhead (FT6) banded to shipping pallet

Dec 4th

- Removed centerwing front spar web (W5)
 - Left side web cut is just inboard of bottle pin
 - Centerwing upper skin cut is aft of S-1. Slots for a lifting cable were cut through the upper skin forward of S-1.
 - Front spar web bottom cut is as low as possible, but above the lower spar cap. This cut location allows all of the milled web addressed by S/B 727-57-0177 to be removed, but maintains the integrity of the keelbeam-to-centerwing lower surface structure.
- Removed Section 41 fuselage skin, frames, and floor structure at the floorline (F14). Structure is light, so it was removed by hand.

Related Figures:

Figure 68: Cuts through longitudinal floor beams and upper centerwing skin

Figure 69: Front spar web cut just above lower cap

Figure 70: Front spar lifted

Figure 71: Front spar lower cap left in aircraft

Figure 72: Removing Section 41 skin, frames, and floor structure at floorline (F14)

Figure 73: Section 41 after F14 was removed

Dec 5th

- Loaded specimens onto trucks for shipment to Delta Technical Operations Center

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- The four large crown panel boxes and aft pressure bulkhead required an oversized load truck. Crown panel boxes were shipped in two stacks of two, with two of the windowbelt panels placed on top.
- The remaining structure was packed on a narrow truck. Note that the load was later re-packaged, but not photographed.

Related Figures:

Figure 74: Preparing the oversized truck

Figure 75: Securing the large crown panel boxes

Figure 76: Securing the load on the standard truck

Figure 77: End of 12/05/02

Dec 9th and Dec 11th

- All structures or their boxes were visually inspected upon arrival in Atlanta. No shipping damage was found.

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Figure 1: Right Wing Cutlines and W7



Figure 2: Left Wing Cutlines

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Figure 3: Under-cutting the left wing



Figure 4: Removing left wing shoring from under W6

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Figure 5: Supporting W6 prior to upper cut



Figure 6: Stacking new right wing shoring inboard of W7

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Figure 7: W7 removed



Figure 8: Removing the outer sections of the horizontal stabilizer

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Figure 9: Painting the fuselage crown cut lines



Figure 10: Supporting the H1 and H2 prior to removal

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Figure 11: H1 and H2 lifted from vertical stabilizer



Figure 12: H1 and H2 lowered to ground

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Figure 13: First of three vertical stabilizer sections removed



Figure 14: Painted cut-lines finished

SHEET	30	NO.	4-086484-20
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Figure 15: Last vertical fin section above FN1/FN2 removed



Figure 16: Start crown panel cuts

SHEET	31	NO.	4-086484-20
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Figure 17: Lifting straps between S-3 and S-4



Figure 18: F3/FT1 removed

SHEET	32	NO.	4-086484-20
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Figure 19: F3/FT1 guided to staging area



Figure 20: F3/FT1 lower onto staging ties

SHEET	33	NO.	4-086484-20
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Figure 21: F4/FT2 removed

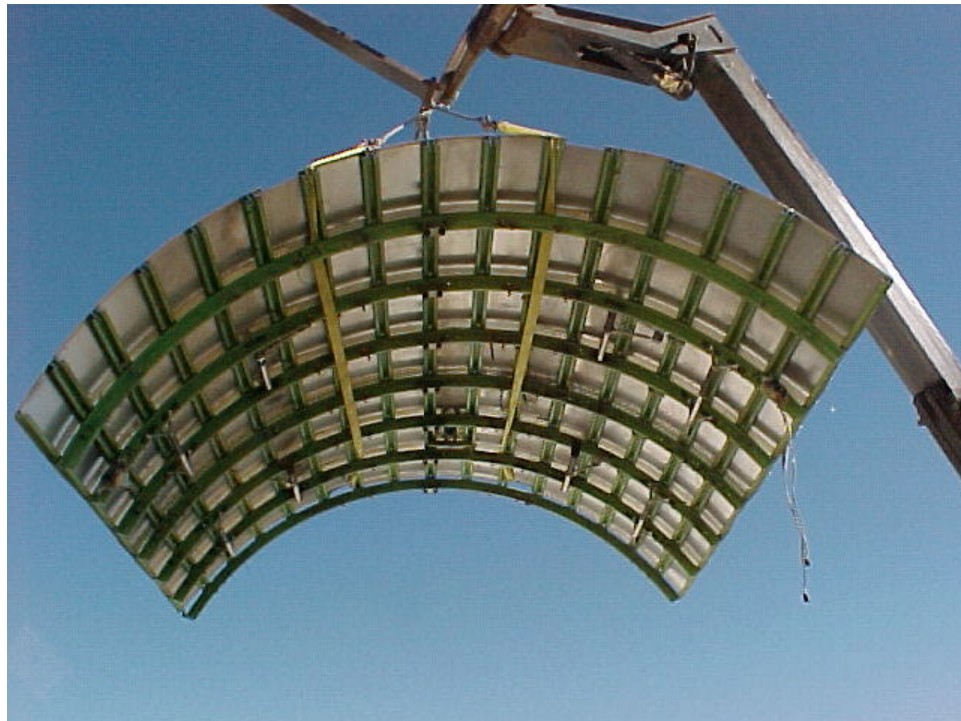


Figure 22: Lift point uses stringer centerline

SHEET	34	NO.	4-086484-20
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Figure 23: Staging area for 4 large crown panels

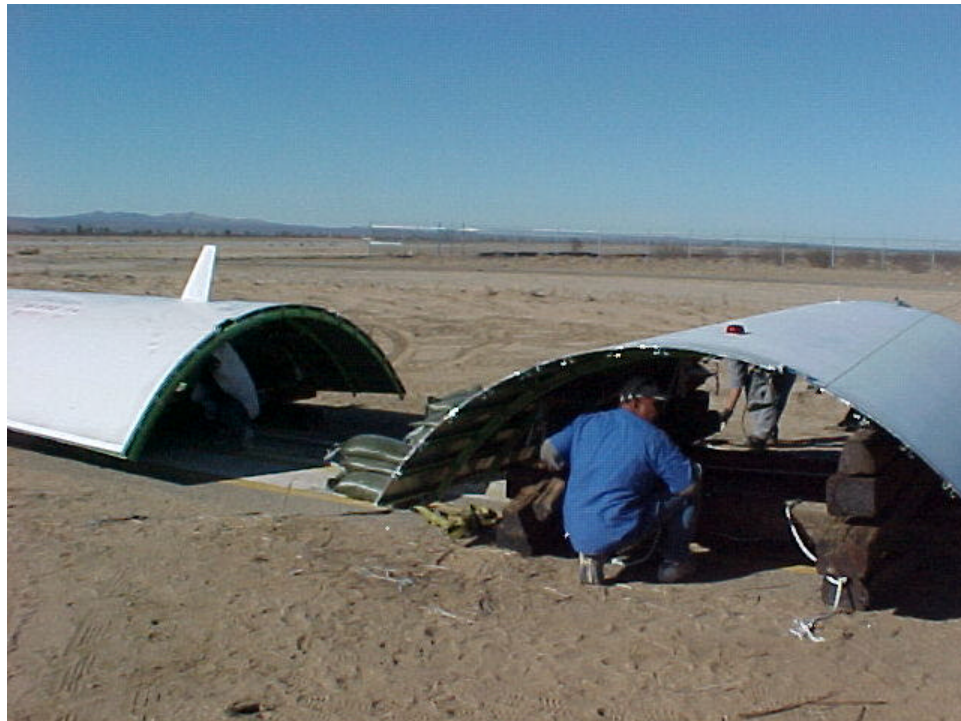


Figure 24: Panels secured to staging ties

SHEET	35	NO.	4-086484-20
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Figure 25: Cutting through steel frame straps for F5/FT3



Figure 26: F5/FT3 removed

SHEET	36	NO.	4-086484-20
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ISSUE DATE	12/17/02		

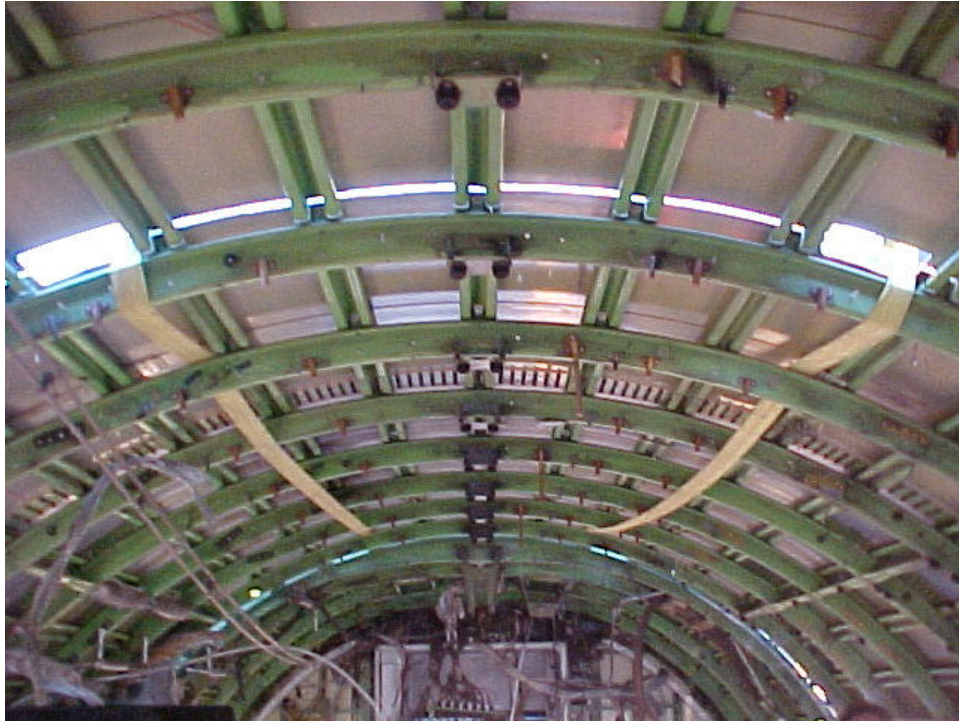


Figure 27: F6/FT4 Ready for lifting



Figure 28: F6/FT4 removed

SHEET	37	NO.	4-086484-20
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Figure 29: F6/FT4 carried to staging area



Figure 30: End of 11/14/02

SHEET	38	NO.	4-086484-20
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Figure 31: F2 removed



Figure 32: W6 and W7 put into boxes

SHEET	39	NO.	4-086484-20
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Figure 33: F1 removed



Figure 34: Overhanging crown section removed

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Figure 35: Support ribs for crown panel boxes



Figure 36: F8 ready to be cut

SHEET	41	NO.	4-086484-20
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Figure 37: F7 removed



Figure 38: F7 lowered to staging ties

SHEET	42	NO.	4-086484-20
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Figure 39: Cutting F8



Figure 40: Removing F8

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SHEET	43	NO.	4-086484-20
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Figure 41: Staging F8



Figure 42: Cutting F10

SHEET	44	NO.	4-086484-20
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ISSUE DATE	12/17/02		



Figure 43: Lifting F10



Figure 44: Cutting F11 and F12

SHEET	45	NO.	4-086484-20
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Figure 45: Removing F11



Figure 46: Cutting F9

SHEET	46	NO.	4-086484-20
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Figure 47: Lowering F9



Figure 48: Cutting FN1 and FN2

SHEET	47	NO.	4-086484-20
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Figure 49: Removing FN1 and FN2



Figure 50: Lowering FN1/FN2 to the staging pallet

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Figure 51: Installing ribs into one of the four large panel boxes



Figure 52: Undercut to remove Section 48

SHEET	49	NO.	4-086484-20
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Figure 53: Section 48 separated



Figure 54: Section 48 stabilized

SHEET	50	NO.	4-086484-20
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Figure 55: Shipping boxes ready for large crown panels

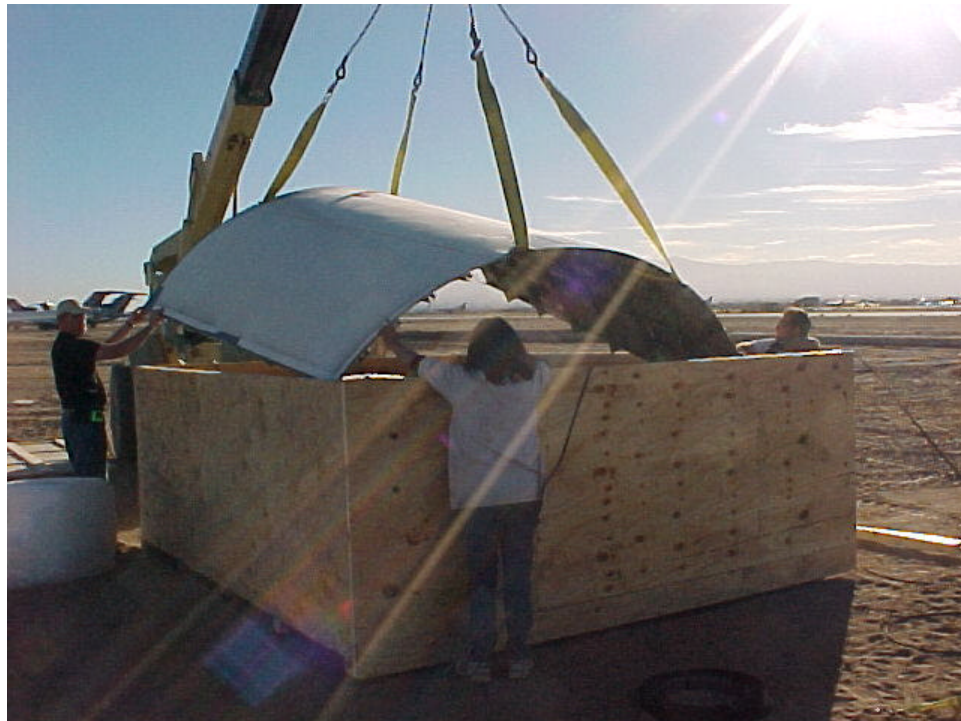


Figure 56: F3/FT1 lowered into its box

SHEET	51	NO.	4-086484-20
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Figure 57: F3/FT1 banded and bubble-wrapped

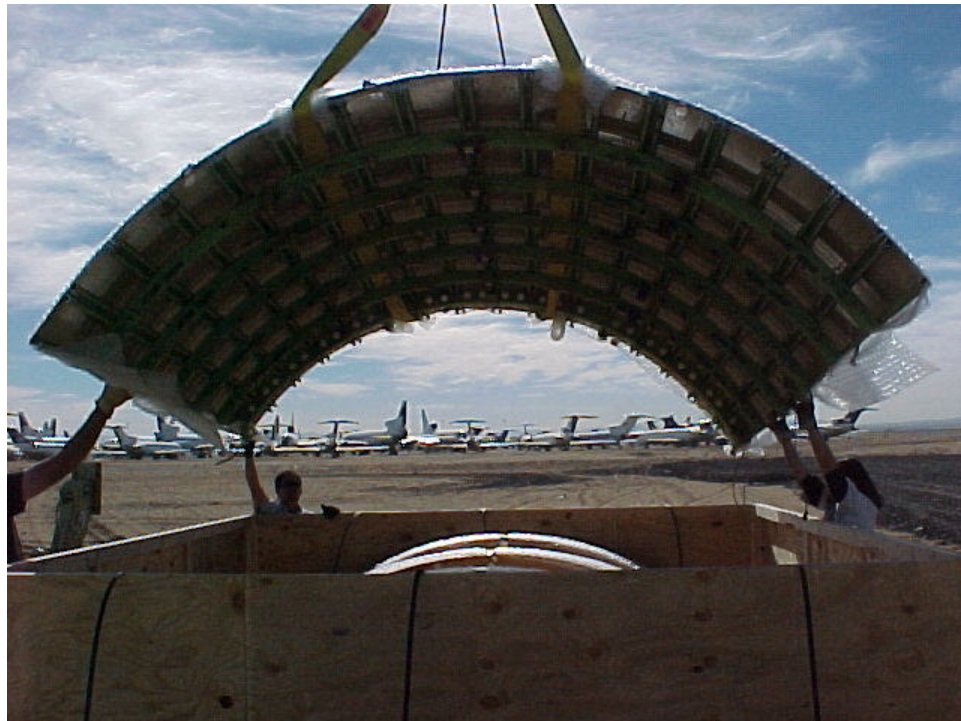


Figure 58: Next panel lowered into box

SHEET	52	NO.	4-086484-20
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Figure 59: Left and right wing fairings and MLG beams removed



Figure 60: Wing root shoring removed

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Figure 61: Left wing stub removed



Figure 62: End of 11/22/02

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Figure 63: Cutting FT6 from Section 48



Figure 64: A/C stabilized against high winds

SHEET	55	NO.	4-08484-20
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Figure 65: Stackable shipping pallets for F7, F8, and F10



Figure 66: Right Side-of-body wing rib (W2/W4) in box

SHEET	56	NO.	4-08484-20
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Figure 67: Aft pressure bulkhead (FT6) banded to shipping pallet



Figure 68: Cuts through longitudinal floor beams and upper centerwing skin

SHEET	57	NO.	4-08484-20
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Figure 69: Front spar web cut just above lower cap

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Figure 70: Front spar lifted



Figure 71: Front spar lower cap left in aircraft

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ISSUE DATE	12/17/02		



Figure 72: Removing Section 41 frames at floorline (F14)



Figure 73: Section 41 after F14 was removed

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Figure 74: Preparing the oversized truck



Figure 75: Securing the large crown panel boxes

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Figure 76: Securing the load on the standard truck



Figure 77: End of 12/05/02